Type MR105

Introduction

This installation guide provides instructions for installation, startup and adjustment. To receive a copy of the instruction manual, contact your local Sales Office or view a copy at www.fisherregulators.com. For further information refer to Type MR105 Instruction Manual, Form 5874, D103246X012.

P.E.D. Category

This product may be used as a pressure accessory with pressure equipment in the following Pressure Equipment Directive 97/23/EC categories. It may also be used outside of the Pressure Equipment Directive using sound engineering practice (SEP) per table below.

PRODUCT SIZE	CATEGORIES
NPS 1 / DN 25	SEP
NPS 2 / DN 50	II
NPS 3 / DN 80	II
NPS 4 / DN 100	II

Specifications

Available Constructions

Type MR105 with low-pressure actuator: Direct-operated large multi-purpose regulator with 5 to 43 psig / 0.35 to 3.0 bar pressure range.

Type MR105 with high-pressure actuator: Direct-operated large multi-purpose regulator with 25 to 300 psig / 1.7 to 20.7 bar pressure range.

Body Sizes and End Connection Styles

DN 25 and 50 / NPS 1 and 2: NPT, CL125 FF, CL250 RF, CL150 RF, CL300 RF, CL600 RF and EN PN 16/25/40 RF

DN 80 and 100 / NPS 3 and 4: CL125 FF, CL250 RF, CL150 RF, CL300 RF, CL600 RF and EN PN 16 RF

Maximum Inlet Pressures(1)

Low-Pressure Actuator: 400 psig / 27.6 bar

High-Pressure Actuator: 400 psig / 27.6 bar

Maximum Outlet Pressures(1)

Low-Pressure Actuator: 70 psig / 4.8 bar

High-Pressure Actuator: 400 psig(2) / 27.6 bar

Maximum Emergency Casing Pressures(1)

Low-Pressure Actuator: 70 psig / 4.8 bar

High-Pressure Actuator: 400 psig(2) / 27.6 bar

Maximum Setpoint(1)

Low-Pressure Actuator: 43 psig / 3.0 bar

High-Pressure Actuator:
Nitrile (NBR) and Ethylene Propylene (EPDM) Diaphragm: 300 psig / 20.7 bar
Fluorocarbon (FKM) Diaphragm: 150 psig / 10.3 bar

Outlet Pressure Ranges(1)

NPS 1 and 2 / DN 25 and 50:
Low-Pressure Actuator: 5 to 12 psig / 0.35 to 0.83 bar; 10 to 24 psig / 0.69 to 1.6 bar; 14 to 32 psig / 0.96 to 2.2 bar; 18 to 43 psig / 1.2 to 3.0 bar
High-Pressure Actuator: 25 to 60 psig(3) / 1.7 to 4.1 bar; 43 to 100 psig / 3.0 to 6.9 bar; 75 to 175 psig(4) / 5.2 to 12.1 bar; 110 to 300 psig(4) / 7.6 to 20.7 bar

NPS 3 and 4 / DN 80 and 100:
Low-Pressure Actuator: 5 to 8 psig / 0.35 to 0.55 bar; 8 to 20 psig / 0.55 to 1.4 bar; 12 to 30 psig / 0.83 to 2.1 bar; 18 to 39 psig / 1.2 to 2.7 bar
High-Pressure Actuator: 39 to 72 psig / 2.7 to 5.0 bar; 71 to 175 psig(4) / 4.9 to 12.1 bar; 110 to 250 psig(4) / 7.6 to 17.2 bar

Temperature Capabilities(1)

Nitrile (NBR): -20 to 180°F / -29 to 82°C

Fluorocarbon (FKM): 20 to 250°F(5) / -7 to 121°C

Ethylene Propylene (EPDM): -20 to 225°F / -29 to 107°C(6)

Maximum Differential Pressures(1)

Liquid Application:
Low-Pressure Actuator:
NPS 1 and 2 / DN 25 and 50: 200 psig / 13.8 bar
NPS 3 and 4 / DN 80 and 100: 225 psig / 15.5 bar
High-Pressure Actuator:
NPS 1 / DN 25: 250 psig / 17.2 bar
NPS 2 / DN 50: 200 psig / 13.8 bar
NPS 3 / DN 80: 225 psig / 15.5 bar
NPS 4 DN 100: 250 psig / 17.2 bar

Other Applications:
Low-Pressure Actuator: 400 psig / 27.6 bar
High-Pressure Actuator: 400 psig / 27.6 bar

Maximum Pressures over Set Pressure to Avoid Internal Parts Damage(1)

Low-Pressure Actuator: 20 psig / 1.4 bar

High-Pressure Actuator: 120 psig / 8.3 bar

1. The pressure/temperature limits in this Installation Guide or any applicable limitation should not be exceeded.
2. Maximum Outlet and Emergency Casing Pressures for constructions with Fluorocarbon (FKM) diaphragm are limited to 230 psig / 15.8 bar or the body rating limit, whichever is lower.
3. NPS 2 / DN 50 body size spring range is limited up to 45 psig / 3.1 bar only.
4. Maximum setpoint is limited to 150 psig / 10.3 bar for constructions with Fluorocarbon (FKM) diaphragm.
5. Fluorocarbon (FKM) is limited to 200°F / 93°C hot water.
6. Ethylene Propylene (EPDM) is limited to 20 to 250°F / -7 to 121°C when used with Low Pressure Actuator.

D103246XUS2

Installation

WARNING

Only qualified personnel should install or service a regulator. Regulators should be installed, operated and maintained in accordance with international and applicable codes and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition.

Personal injury, equipment damage or leakage due to escaping fluid or bursting of pressure-containing parts may result if this regulator is overpressured or is installed where service conditions could exceed the limits given in the Specifications section or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location.

Clean out all pipelines before installation of the regulator and check to be sure the regulator has not been damaged or has collected foreign material during shipping. For NPT bodies, apply pipe compound to the external pipe threads. For flanged bodies, use suitable line gaskets and approved piping and bolting practices.

Vertical installation with the actuator oriented up or down is recommended. The unit will operate in horizontal installation with actuator on the side, however, this could result in premature wear of parts. Make sure that flow will be in the same direction as that indicated by the body arrow. Orientation of the two vents should always be down. Vents may be rotated after regulator installation so that the vent screens are down.

A control line must be installed to allow outlet pressure to register on the actuator's diaphragm. It should be installed four to eight pipe diameters downstream of the regulator and in an area of pipe that is free of turbulence.

Note

It is important that the regulator be installed so that the vent hole in the spring case is unobstructed at all times. For outdoor installations, the regulator should be located away from vehicular traffic and positioned so that water, ice and other foreign materials cannot enter the spring case through the vent. Avoid placing the regulator beneath eaves or downspouts and be sure it is above the probable snow level.

Overpressure Protection

The recommended pressure limitations are stamped on the regulator nameplate. Some type of overpressure protection is needed if the actual inlet pressure exceeds the maximum operating outlet pressure rating. Overpressure protection should also be provided if the regulator inlet pressure is greater than the safe working pressure of the downstream equipment.

Regulator operation below the maximum pressure limitations does not preclude the possibility of damage from external sources or debris in the line. The regulator should be inspected for damage after any overpressure condition.

Startup

The regulator is set at the factory for the setpoint specified on the order or at the midpoint of the spring range. The allowable spring range is stamped on the nameplate. If a pressure setting other than specified is desired, be sure to change the pressure setting by following the Adjustment section. With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream shutoff valves (if applicable).

Adjustment

To change the outlet pressure, loosen the locknut and turn the adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. Monitor the outlet pressure with a test gauge during the adjustment. Tighten the locknut to maintain the desired setting.

Taking Out of Service (Shutdown)

WARNING

To avoid personal injury resulting from sudden release of pressure, isolate the regulator from all pressure before attempting disassembly.

Parts List

Key	Description
1	Valve Body
2	Body Flange
3	Stud Bolt
4	Gasket
5	Lower Indicator Fitting
6	O-ring Retainer
7	Indicator O-ring
8	Hex Nut
9	Valve Spring
10	Indicator Stem
11	Cage
12	Port Seal
13	Seat Ring
14	Piston Ring
15	Upper Seal
16	Valve Plug
17	Cage O-ring
18	Travel Indicator Scale
19	Travel Indicator Protector
20	Valve Plug O-ring
21	Lower Indicator Fitting O-ring
22	Flange Nut
23	E-Ring
24	Drive Screw
25	Flow Arrow
26	Vent
27	Plug
28	Spring Seat
29	Hex Nut
30	Pipe Plug
33	NACE Tag (not shown)
34	Seal Wire (not shown)
35	Indicator Fitting
36	Back O-ring
37	Indicator Fitting O-ring
38	Pipe Plug
40	Actuator Stem
43	Nameplate
44	Lube Fitting
45	Wiper Ring
46	Bearing
47	Valve Stem O-ring
48	Jam Nut
49	Spring Washer
51	Lower Diaphragm Head O-ring
52	Lower Spring Guide
53	Lower Diaphragm Head
54	Lower Spring Seat
55	Diaphragm Plate
56	Diaphragm
57	Cap Screw or Stud Bolt
58	Hex Nut
60	Bonnet O-ring
61	Bonnet
62	Lower Diaphragm Casing
63	Upper Diaphragm Casing
64	Spring Case Spacer O-ring
64	Upper Diaphragm Casing O-ring
65	Cap Screw
66	Spring Case Spacer
67	Cap Screw
68	Control Spring
69	Upper Spring Seat
70	Spring Case
71	Seal Washer (not shown)
72	Jam Nut
73	Adjusting Screw
75	Restrictor (not shown)
76	Pipe Bushing
81	Pipe Nipple (not shown)
82	Drain Valve (not shown)
84	Internal Stiffener Plate
85	Bleed Valve (not shown)
87	Upper Casing Welding Assembly (not shown)

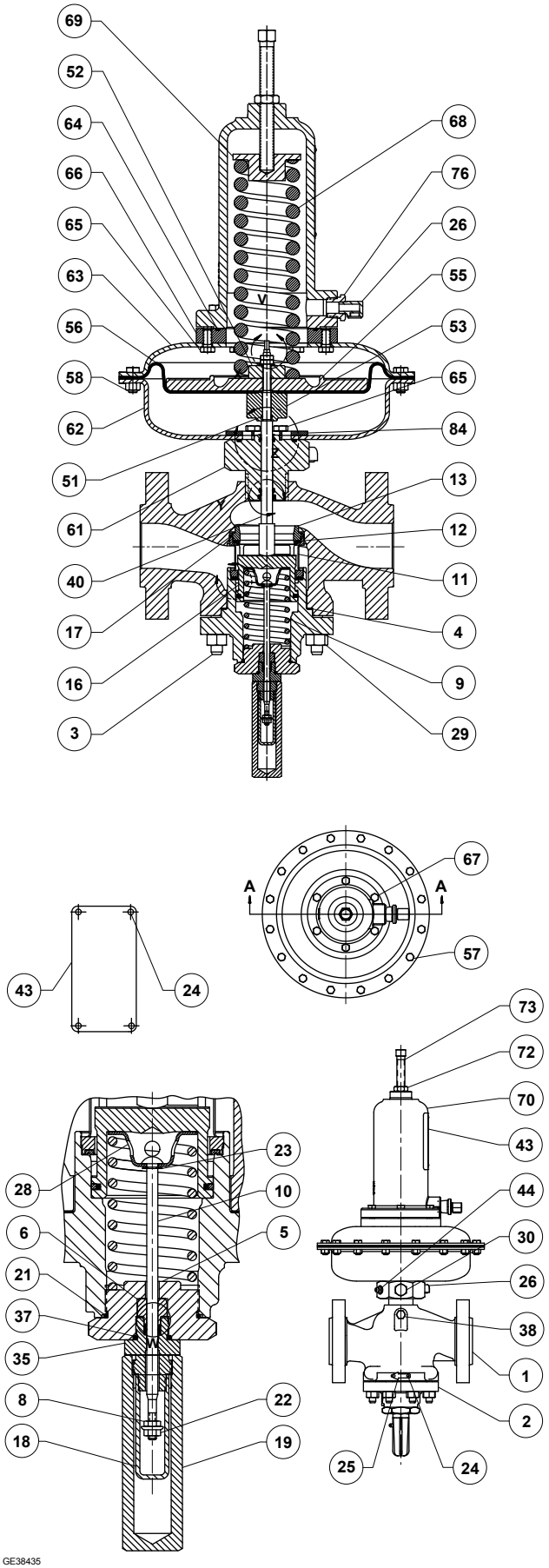

Figure 1. *Type MR105 Assembly Drawings*

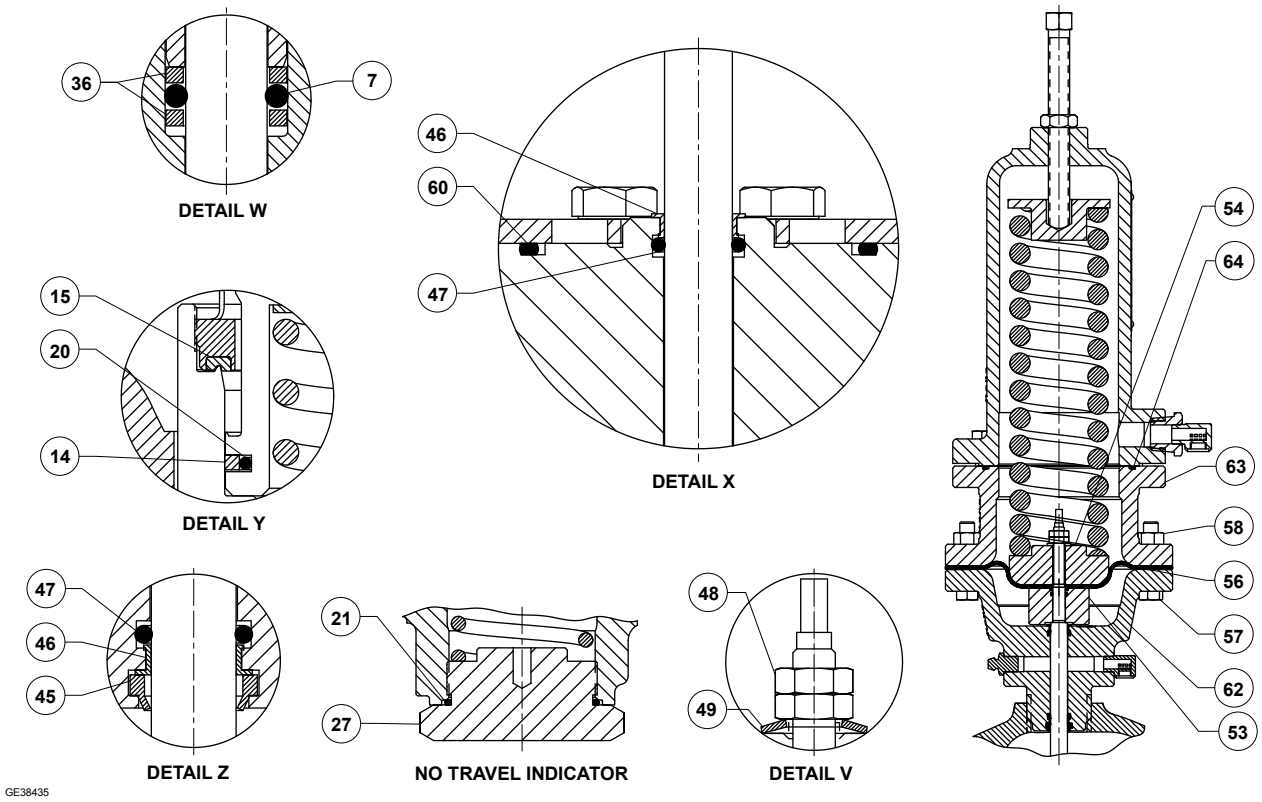

Figure 1. *Type MR105 Assembly Drawings (continued)*

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